

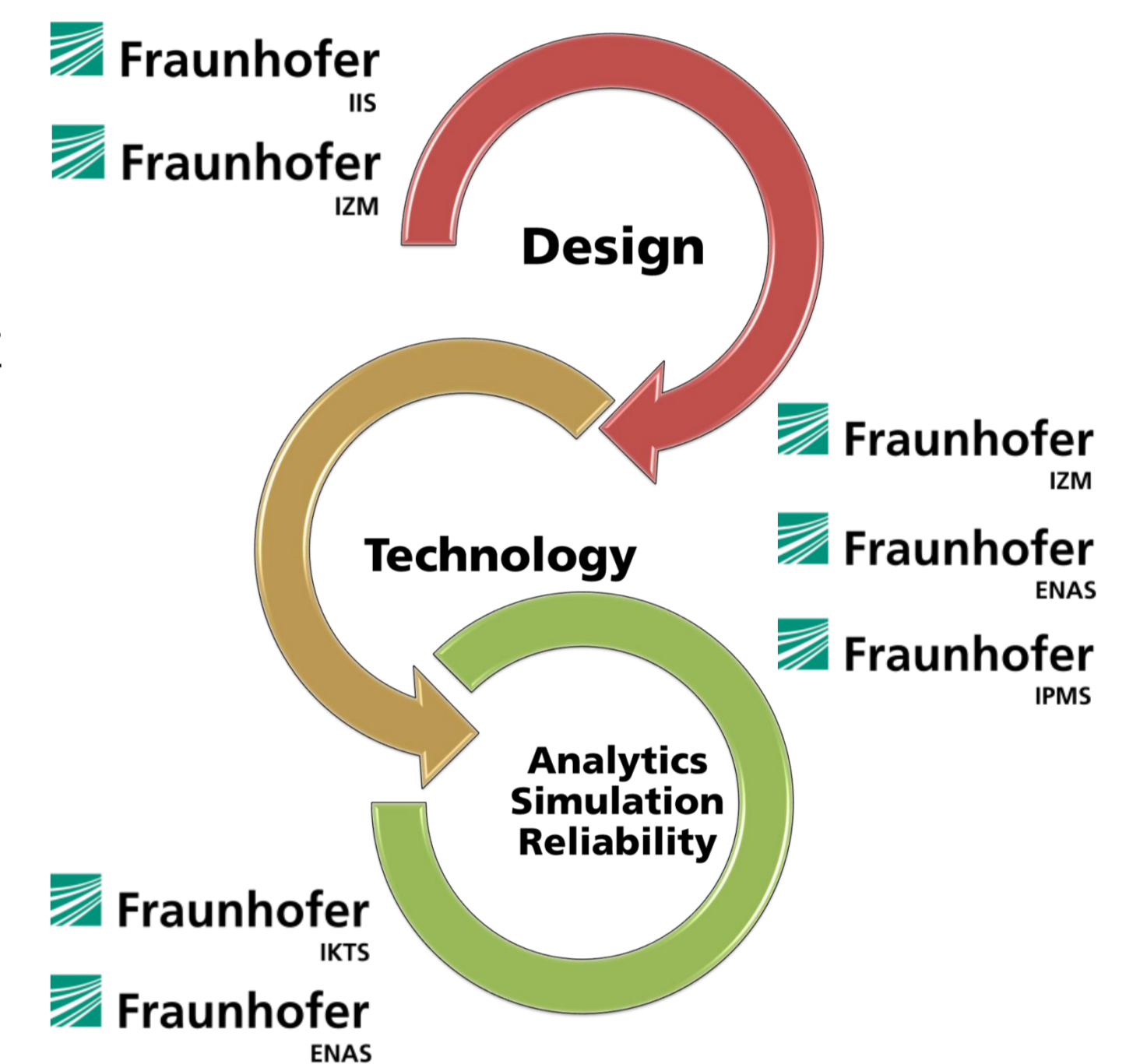
Fraunhofer Cluster 3D Integration - Key to a Holistic Technology and Service Approach

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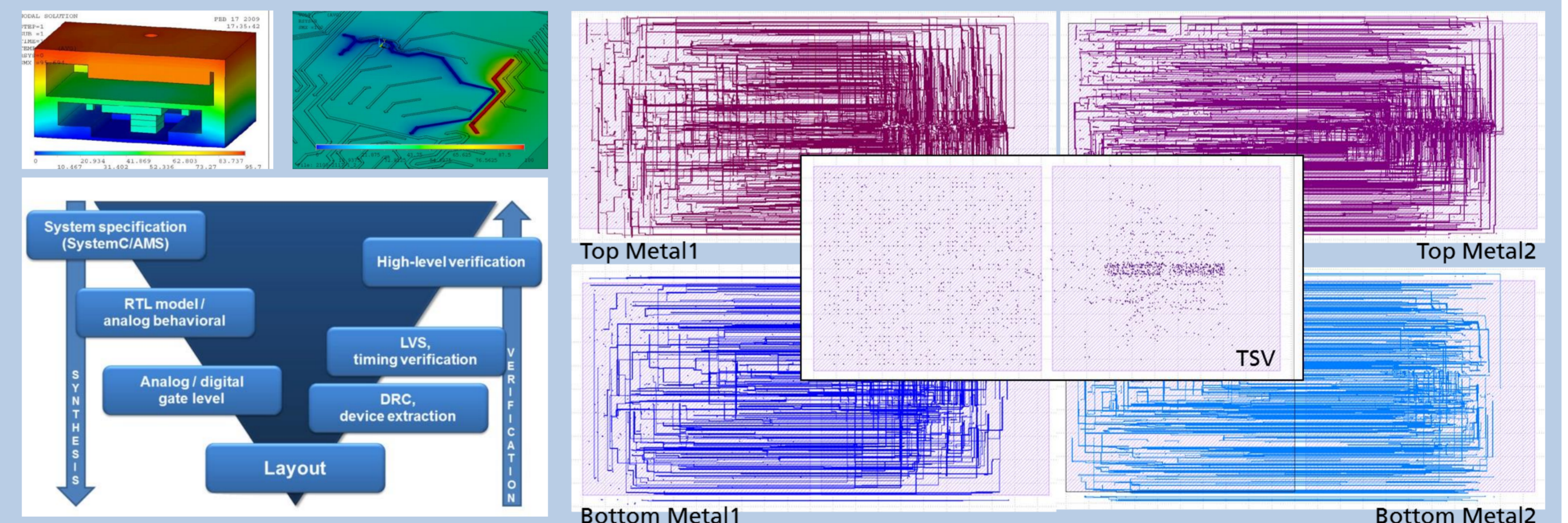
OVERVIEW

3D integration - as a key technology - is of high significance for the realization of future innovative products. With its outstanding competencies in the fields of technology, design and reliability, Fraunhofer-Gesellschaft offers an excellent base and prerequisite for the market-oriented implementation of 3D integration for the industry in Germany, Europe and worldwide. To meet the complexity of this technological approach, the Fraunhofer institutes IZM, ENAS, IIS/EAS, IKTS-MD and IPMS cluster their competencies in a network to cover a broad spectrum of topics related to 3D integration. The Fraunhofer cluster 3D integration especially focuses on 3D integration as a holistic approach. Altogether around 550 scientists and technical assistants are working in 3500 m² cleanrooms and in 900 m² test/analytical labs with leading-edge equipment. With this, Fraunhofer is well positioned to meet the technical requirements and to deal with the major enabling technologies in a holistic way.

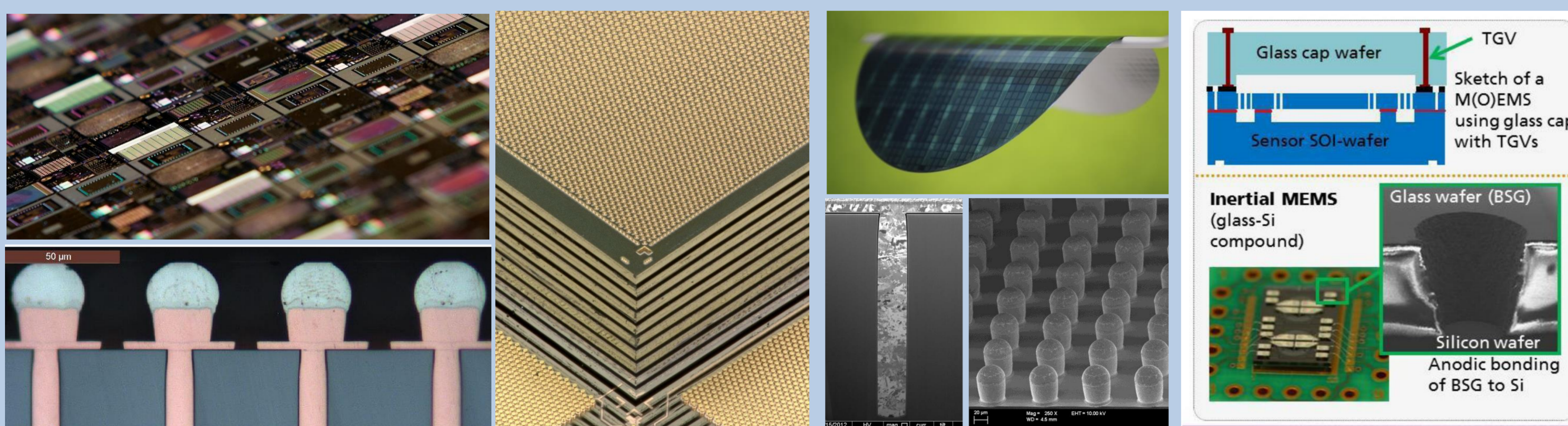


FOCUS ON DESIGN

- Methods, knowledge and comprehensive support for all design stages from high level system descriptions (e.g. system C/AMS) down to the implementation level
- Design services from prototyping to preparation for mass production (e.g. studies, development of system components, system implementations)
- Support of important verification methods (e.g. DRC, LVS, parasitic extraction and back annotated timing verification)
- Multi-Physical effects analysis by using a modular Approach and commercial tools e.g. finite and boundary element methods (FEM, BEM)



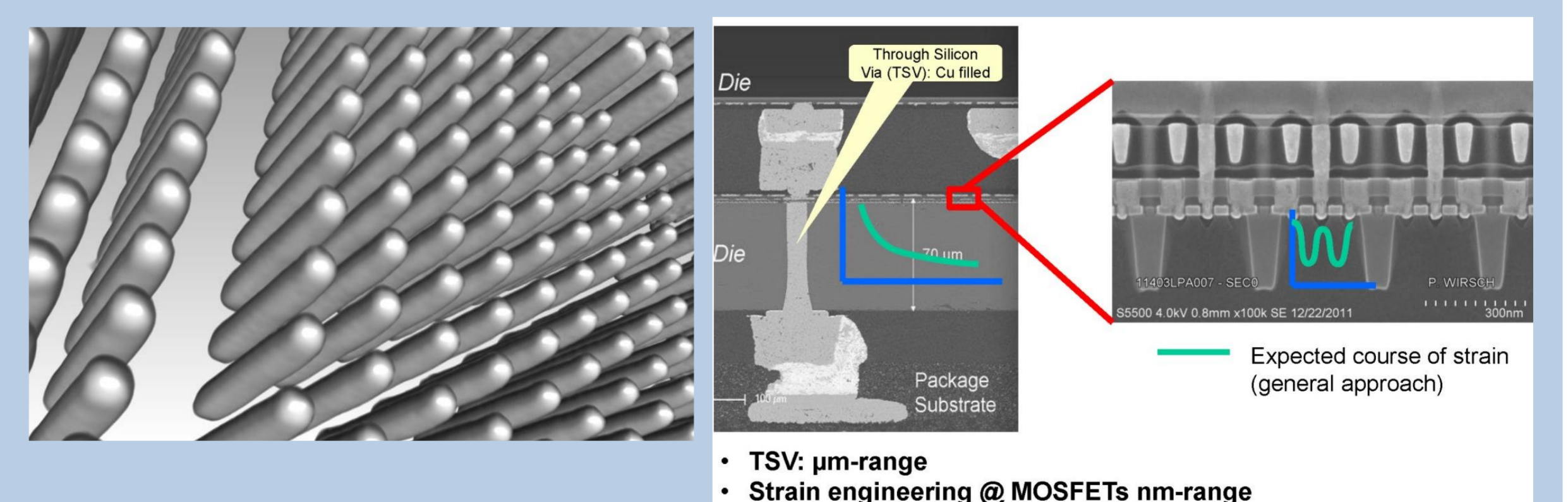
FOCUS ON TECHNOLOGY



- Cu-TSV Formation (via first, middle, last, BS via last) for prototyping and low-volume manufacturing
- Wafer thinning / Backside grinding
- Temporary bonding / debonding process evaluation
- Chip interconnection (bumping) formation
- 3D assembly / stacking (D2D, D2W, D2IP, IP2P)
- MEMS direct integration
- Passive / active silicon interposer
- Hermetic MEMS packaging

FOCUS ON ANALYTICS, SIMULATION, RELIABILITY

- Identification of potential thermo-electro-mechanical weak points in future 3D structures by using best-in-class numerical simulation and experimental analysis
- Characterization of local material properties exactly as they are in the particular structure by nano-analysis techniques such as nano-indentation, FIB sectioning, X-ray inspection and automated high resolution image correlation
- Failure analysis in 3D TSV structures e.g. voids or delamination



CONTACT

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